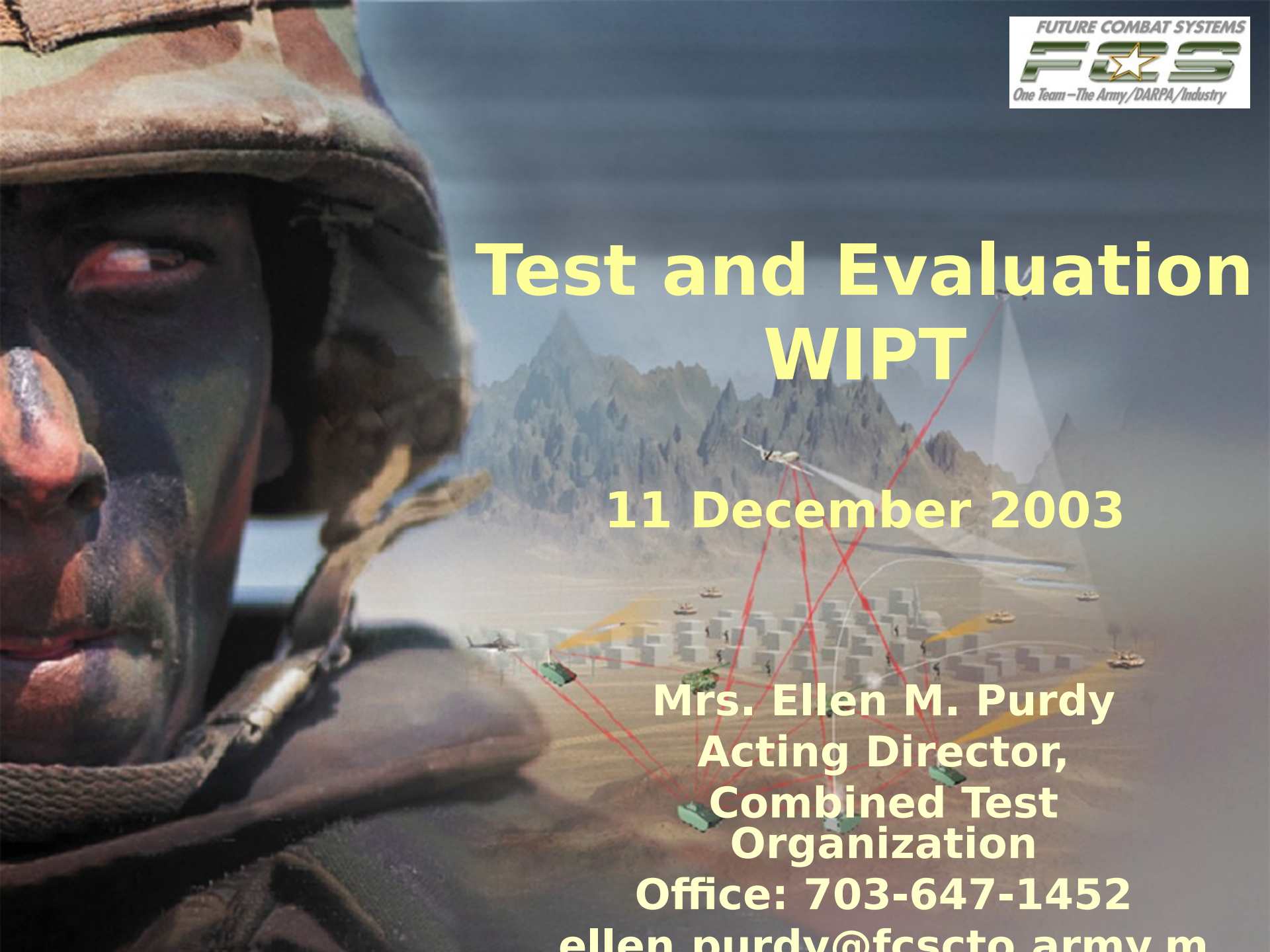

Test and Evaluation WIPT

11 December 2003

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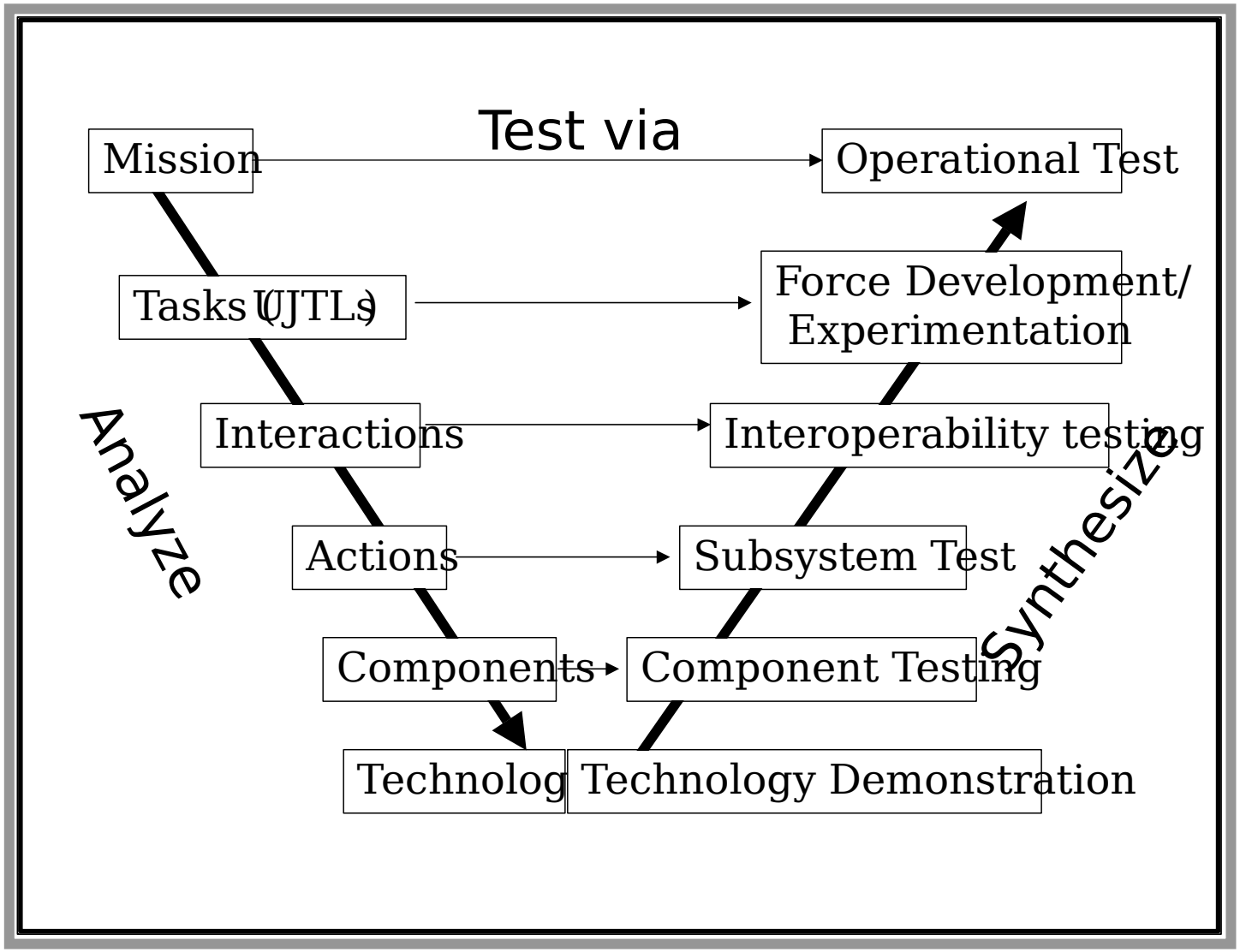
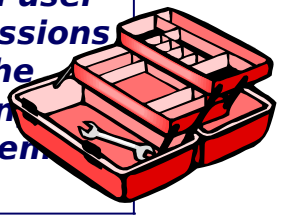
Analysis – Synthesis Model



Army Test & Evaluation Command Mission to Capability Trace

FUTURE COMBAT SYSTEMS FCS One Team – The Army/DARPA/Industry

Mission-Task decomposition provides the test planner with a powerful tool to design the best test plan possible. It stems from user validated scenarios, missions and tasks --providing the framework for evaluating demonstrated FCS system and SoS capabilities



Missions

to accomplish

comprise

Tasks

to perform

DOTLPF *

enabled by

Capabilities

provides

as supplied by

Materiel

Answers the "So What?" Question

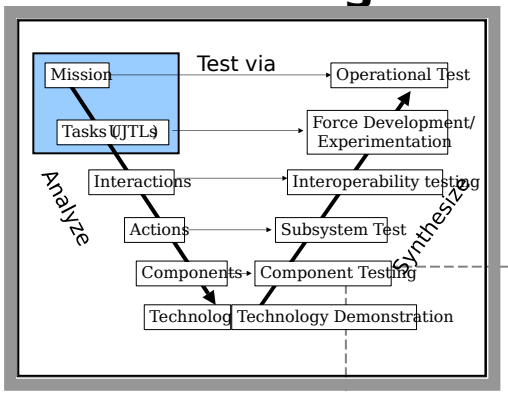
* Doctrine, Organization, Training, *Materiel,* Leadership and Education, Personnel,

Step Evaluation Methodology

FUTURE COMBAT SYSTEMS
FCS
One Team – The Army/DARPA/Industry

1. Mission-Task Decomposition
2. Critical Task Selection
3. Performance Capabilities for Critical Tasks
4. Capabilities to Evaluation Focus Areas
5. Capabilities to FCS Sub-Systems
6. FCS Sub-System Performance
7. Degraded States of FCS Sub-System Performance
8. Aggregation to ESS
9. Model-Test -Model

Missions to accomplish **Tasks** comprise



Combined Arms Battalion (CAB)
- Phase 1-CAB2 attacks to secure Objective Camel
- Phase 2-CAB2 **…**
- Phase 3-CAB2 **…**

Phase 1

Command and Control Army Tactical Task (ART) 7.0

Manage Tactical Information ART 7.2

Collect Relevant Information ART 7.2.1

Process Relevant Information to Create COP ART 7.2.2

Display COP Tailored to User Needs ART 7.2.3

Intelligence ART 1.0

Collect Intelligence ART 1.2

Step 1 & Step 2

What does the Operational & Organizational (O&O) Plan and Operational Requirements Document (ORD) really mean with respect to enabling accomplishment of the Unit of Action Missions and how the

Step 1: Mission-Task Decomposition
Step 2: Critical Task Selection

Tasks Identified For Mission Mapped To O&O Capabilities

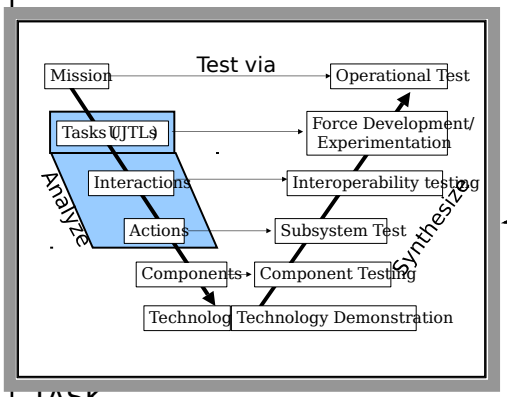
(What must be done in a test to enable evaluation of capabilities?)

FUTURE COMBAT SYSTEMS FCS One Team – The Army/DARPA/Industry

Tasks **to perform** **O&O Capabilities**

enabled by

Capabilities



Step 3

TASK	AUTL Ref #	F12: Enable dissemination of tactical scheme	F15: Enable continuous situational understanding through networked force	F16: Facilitate automatic language translation	F17: Enable information exchange via adaptive, integrated communications	F18: Detect/prevent intruders/malicious software; identify points of intrusion/origin, information compromised/introduced into the network	F19: Enable Positional Navigation (POSNAV)	F20: Enable information management to fuse, monitor and disseminate information to support CCIR, combat action, decision-making and analysis	F21: Establish an adaptive learning repository to build and manage a library of friendly and enemy DTLOMS and lessons learned	F22: Enable terrain analysis	F23: Integrate synergistic use of ISR to see the full range of operational variables
Manage Tactical Information	ART 7.2		x	x	x	/		x			x
Process Relevant Information to Create a Common Operational Picture	ART 7.2.2		x	/	/	x	/	x	x	x	/
Display a Common Operational Picture (COP) Tailored to User Needs	ART 7.2.3	/	x	x	/	/		/			
ART 7.2.4 Store Relevant Information											
Disseminate COP and Execution Information to Higher, Lower, Adjacent, Supported, and Supporting Organizations	ART 7.2.5	x	x	/	x	/		/			/
ART 7.2.6 Communicate with Non-English Speaking Forces and Agencies											

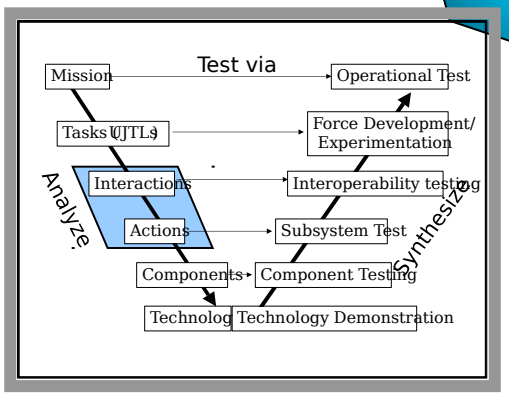
Step 3: Performance Capabilities for Critical Tasks

Red with an X = Direct enabler of intent of task
Yellow with a / = Enables performing task to standard

Step 4: Functional Capabilities to Evaluation Focus Areas

FUTURE COMBAT SYSTEMS FCS One Team – The Army/DARPA/Industry

Lethality
F1: Capability to destroy enemy formations via LOS, BLOS and/or NLOS
F2: Organizationally employ fire delivery
F3: Scale effects to focus precisely
F4: Employ minefields
F5: Maximize lethality of dismounted
F6: "Avenge" kill enemy systems engaging or preparing to engage friendly systems
F7: Air defense (AD) lethality



C4ISR
F8: Support mission planning/mission rehearsal
F9: enable battle command and control
F10: Enable continuous estimate of situation
F11: Enable visualization of tactical scheme
F12: Enable dissemination of tactical scheme
F13: Detect presence/identify disposition of anti-tank/personnel mines, booby traps
F14: Detect, locate other non-mine/booby trap, man-made obstacles
F15: Enable continuous situational understanding through networked force
F16: Facilitate automatic language translation
F17: Enable information exchange via adaptive integrated communications
F18: Detect/prevent intruders/malicious software; identify points of intrusion
F19: Enable POSNAV

C4ISR (cont.)
F20: Enable information management to fuse, monitor and disseminate information to support CCIR, combat action, decision-making and analysis
F21: Establish an adaptive learning repository to build and manage a library of friendly and enemy DTLOMS and lessons learned
F22: Enable terrain analysis
F23: Integrate synergistic use of ISR to see the full range of operational variables
F24: Provide combat identification to detect, locate and identify friend, for and noncombatants and systems
F25: Determine what is most dangerous
F26: Enable command and control needed to synchronize fire, maneuver and ISR
F27: Enable sensor to shooter linkage
F28: Provide improved early warning and dissemination of threats

Step 4: Functional Capabilities to Evaluation Focus Areas (cont.)

FUTURE COMBAT SYSTEMS
FCS
One Team – The Army/DARPA/Industry

Mobility
F29: Maneuver into and out of contact
F30: Enable decisive maneuver
F31: Enable development of situation out of contact
F32: Provide for tactical mobility
F33: Counter/neutralize/clear/mark anti-tank/personnel mines, booby traps
F34: Breach disrupting/fixing obstacles
F35: Cross gaps (i.e. streams, irrigation ditches)
F52: Conduct air assault operations

Survivability
F36: Enable protective countermobility and survivability support
F37: Enhance individual soldier survivability
F38: Degrade enemy detection and terminal targeting
F39: Defeat/intercept enemy threats
F40: Enable blinding the enemy
F41: Provide area suppression capability

MANPRINT
F42: Facilitate improved soldier performance
F51: Provide a multi-echelon training construct

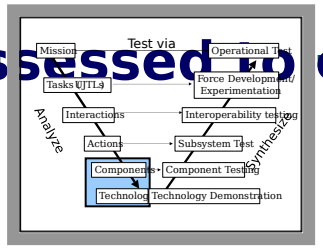
Sustainability
F43: Enable medical treatment and evacuation of wounded soldiers
F44: Enable reduction in the maneuver sustainment footprint and demand for replenishment
F45: Enable organic Unit of Action sustainment
F46: Simplified systems maintainability to reduce maintenance and replenishment burden
F47: Water generation and replenishment
F48: Provide capability to monitor, report and submit requests to facilitate anticipatory sustainment
F49: Provide a means of transporting people and materiel
F50: Dismounted forces must be self-sustaining

Step 4: Capabilities to Evaluation Focus Areas

O&O Capabilities Mapped to Materiel via ORD & PCDs

(What materiel will be assessed to evaluate capability of interest?)

Capabilities provides as supplied by Materiel



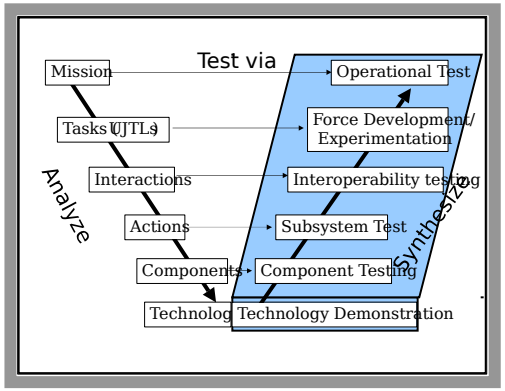
Step 5

Step 5: Capabilities to FCS Sub-Systems

O&O Capability	ORD Ref. #	SoS Spec. Citation	Procurement Control Drawings (PCD)
F23: Integrate synergistic use of ISR to see the full range of operational variables	3160	3.2.1.2.1.8; 3.7.23.2.1.14	786-300146, Situation Understanding (SU) SSS; 786-300151
	2392	3.2.1.2.1.3; 10.2.1.2.3.1	786-300151
F24: Provide combat identification to detect, locate, and identify friend, foe and noncombatants and systems	2850	3.2.1.2.3.4.2; 3.7.23.2.1.2.18; 3.7.23.2.1.18.1; 3.7.23.2.1.2.5; 3.2.1.2.3.4.5; 3.2.1.2.3.4.3; 3.2.1.2.3.4.1; 3.2.1.2.3.4.4	786-30022, Armed Robotic Vehicle (ARV); 786-30082, Combat ID System; 786-300146, Situation Understanding (SU) SSS; 786-300151
F25: Determine what is most dangerous	1215	3.2.1.4.4	786-300144, C2 Battle Command & Mission Execution SSS; 786-300145, C2 Planning & Preparation SSS; 786-300151
	3407	3.7.4.2.1.4.1; 3.7.4.2.1.4.2	786-30001, MCS; 786-300145, C2 Planning & Preparation SSS; 786-300146, Situation Understanding (SU) SSS
F26: Enable command and control needed to synchronize fire, maneuver and ISR	1061	3.2.1.2.3.5; 3.2.1.8.15.1.1; 3.2.1.8.15.1.2; 3.2.1.8.15.1.2.2; 3.7.23.2.1.2.8.5; 3.7.23.2.1.7.1; 3.7.23.2.1.7.2	786-300144, C2 Battle Command & Mission Execution SSS; 786-300145, C2 Planning & Preparation SSS; 786-300146, Situation Understanding (SU) SSS; 786-300149, Warfighter Machine Interface (WMI), 786-300151
F27: Enable sensor to shooter linkage	2406	3.2.1.2.3.2	786-30090, Sensor Data Management; 786-30091; 786-30092, C4ISR Level 1 Sensor Fusion; 786-300144, C2 Battle Command & Mission Execution SSS; 786-300145, C2 Planning & Preparation SSS; 786-300146, Situation Understanding (SU) SSS; 786-300151

Army Test & Evaluation Command
Mission to Capability Trace

FUTURE COMBAT SYSTEMS
FCS
One Team – The Army/DARPA/Industry



Missions — **To Accomplish** → **Tasks**

comprise

Tasks — **To Perform** → **Capabilities**

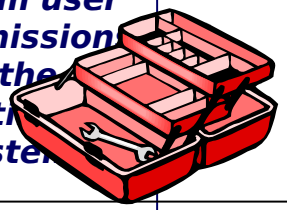
enabled by

DOTLPF *

Capabilities — **Provides** → **Materiel**

as supplied by

Mission-Task decomposition provides the test planner with a powerful tool to design the best test plan possible. It stems from user validated scenarios, missions and tasks --providing the framework for evaluating demonstrated FCS system and SoS capabilities



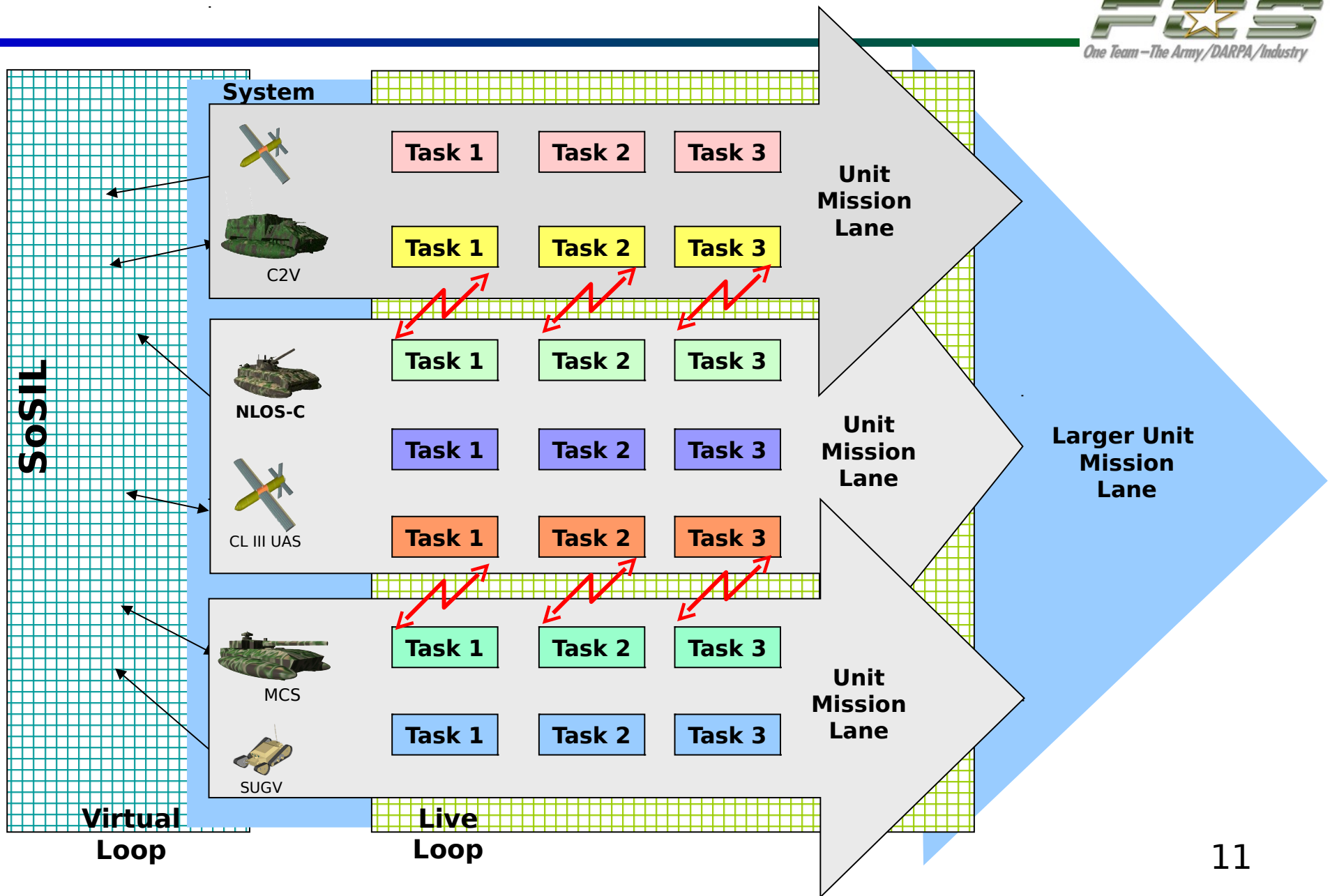
Step 7: Degraded States of FCS Sub-System Performance

Step 7

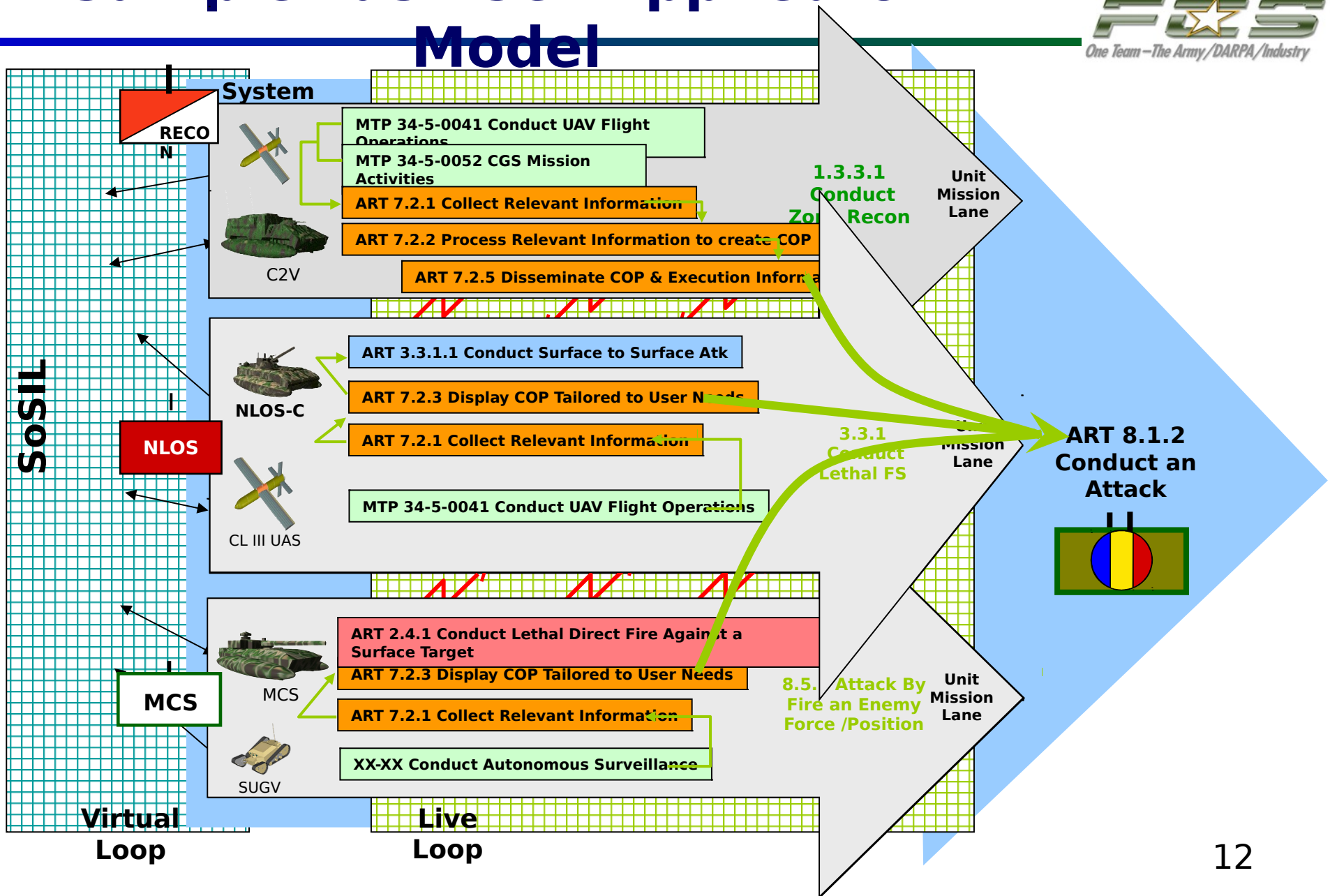
Operational vignettes used to identify expected interactions with environment

* Doctrine, Organization, Training, *Materiel,* Leadership and Education, Personnel, Facilities

UA Missions in OT



Sample Task Set Applied OT Model


System
RECON
MTP 34-5-0041 Conduct UAV Flight Operations
MTP 34-5-0052 CGS Mission Activities
ART 7.2.1 Collect Relevant Information
ART 7.2.2 Process Relevant Information to create COP
ART 7.2.5 Disseminate COP & Execution Inform a
C2V
1.3.3.1 Conduct Zo Recon
Unit Mission Lane
SoSIL
NLOS
NLOS-C
ART 3.3.1.1 Conduct Surface to Surface Atk
ART 7.2.3 Display COP Tailored to User Needs
ART 7.2.1 Collect Relevant Information
CL III UAS
MTP 34-5-0041 Conduct UAV Flight Operations
3.3.1 Conduct Lethal FS
Unit Mission Lane
ART 8.1.2 Conduct an Attack
MCS
MCS
ART 2.4.1 Conduct Lethal Direct Fire Against a Surface Target
ART 7.2.3 Display COP Tailored to User Needs
ART 7.2.1 Collect Relevant Information
SUGV
XX-XX Conduct Autonomous Surveillance
8.5. Attack By Fire an Enemy Force /Position
Unit Mission Lane
Virtual Loop
Live Loop

Conclusions

FUTURE COMBAT SYSTEMS
FCS
One Team – The Army/DARPA/Industry

- **Understanding User's Intent and Operational Concept informs Evaluator and enables construction of doctrinally valid and viable test events to assess FCS capabilities in meeting Operational Effectiveness, Suitability, Survivability**

- **Mission to Means Framework is clearly understand and promoted by the Program Manager and is being implemented**

- **Framework was demonstrated and approved by Senior Army and PEO leadership at T&E Summits III and IV**